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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,854	01/30/2004	Yusuke Fukuchi	03500.000091.	4133

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EXAMINER

LE, DUNG ANH

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 02/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/766,854

Applicant(s)

FUKUCHI, YUSUKE

Examiner

DUNG A. LE

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/18/2006.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

This is a new ground of rejection

Oath/Declaration

The oath/declaration filed on 1/30/2004 is acceptable.

Information Disclosure Statement

This office acknowledges of the following items from the Applicant:

Information Disclosure Statement (IDS) filed on 1/18/2006 has/have been considered and made of record. The references cited on the PTOL 1449 form have been considered.

Specification

The specification is objected to for the following reason:

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed (see MPEP § 606.01).

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-6 are rejected under 35 USC 102 (e) as being anticipated by Sera et al. (2005/0212074 A1).

Sera et al. teach a processing method for forming an insulated film 22 on a surface of a substrate 1 to be processed, through an oxynitriding treatment, the processing method comprising the steps of:

nitriding a surface of the substrate by irradiating plasma containing nitrogen atoms onto the substrate [0050-0051]; and

oxidizing the surface of the substrate, which has been nitrided, by irradiating plasma containing oxygen atoms [0052].

Regarding claim 2, wherein the nitriding and oxidizing steps place the substrate on a susceptor, a temperature of the susceptor being maintained at 600C. or lower (300-650C, see [0050; 0052; 0059]).

Regarding claim 3, wherein the substrate include silicon, and the nitriding and oxidizing steps control a process time so that the insulated film has an effective oxide thickness of 3.0 nm or smaller [0052].

Regarding claim 4, wherein the nitriding step uses [0050], as process gas, gas that includes at least one of N_{2} , NH_3 and N_2H_4 or the one which is diluted with at least one of He, Ne, Ar, Kr and Xe, mixed gas of H_2+N_2 or the one which is diluted with at least one of He, Ne, Ar, Kr and Xe.

Regarding claim 5, wherein the oxidizing step gas uses [0052], as process gas, gas that includes at least one of O_2 , O_3 , H_2O , and H_2O_2 or the one which is diluted with at least one of He, Ne, Ar, Kr, Xe and N_2 .

Regarding claim 6, wherein the oxidizing step sets ion energy to be 5 eV or smaller incident to the substrate from the plasma [0060].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7- 8 are rejected under 35 U.S.C. 103 (a) as being unpatentable over in view of Sera et al. the following remark.

Regarding claim 7, Sera et al. teach the claimed invention as applied to claim 1 except for the substrate includes silicon, and the oxidizing step controls an oxygen atom concentration so that a nitrogen atom concentration is 5% or smaller at a position near an interface between the silicon and a silicon oxynitride film in the insulated film as cited in current claim.

However, it would have been obvious to one having ordinary skill in the art making semiconductor device to determine the workable or optimal value for the

substrate includes silicon, and the oxidizing step controls an oxygen atom concentration so that a nitrogen atom concentration is 5% or smaller at a position near an interface between the silicon and a silicon oxynitride film in the insulated film through routine experimentation and optimization to optimal device performance.

Regarding claim 8, Sera et al. teach the claimed invention as applied to claim 1 except for the nitriding step controls a process time so that the insulated film contains the nitrogen atoms between $3 \times 10^{14} \text{ cm}^{-2}$ and $1.5 \times 10^{15} \text{ cm}^{-2}$ that is converted into a surface density.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the nitriding step controls a process time so that the insulated film contains the nitrogen atoms between $3 \times 10^{14} \text{ cm}^{-2}$ and $1.5 \times 10^{15} \text{ cm}^{-2}$ that is converted into a surface density., since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is (571) 272-1784. The examiner can normally be reached on Monday-Tuesday and Thursday 6:00am- 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The central fax phone numbers for the organization where this application or proceeding is assigned are (571)272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUNG A. LE
Primary Examiner
Art Unit 2818

